

A. BEDOS &amp; L. DEHARVENG

Université Paul Sabatier, Toulouse, France

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UNIVERSITY**CEPHALACHORUTES GEN. N., A NEW GENUS OF  
TROPICAL NEANURIDAE (COLLEMBOLA)**

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*Cephalachorutes*, a new genus of Neanuridae (Pseudachorutinae) Collembola, is described with five new species from Southeast Asia (*C. asiaticus* sp. n., *C. barthae* sp. n., *C. caecus* sp. n., *C. centurionis* sp. n., *C. pestilentiae* sp. n.) and one new species from Papua-Niugini (*C. murphyi* sp. n.). In addition, three species from Africa described in *Arlesia*, and one species from Nepal described in *Pseudachorutella* are moved to *Cephalachorutes*.

Correspondence: A. Bedos and L. Deharveng, Laboratoire de Zoologie, Ecologie des Invertébrés terrestres, UPR CNRS 8491, Université Paul Sabatier, 118 route de Narbonne, 31062 Toulouse Cedex, France.

Key words. – Collembola, Neanuridae, tropical forest.

Collections of forest soil fauna from Southeast Asia frequently contain small Pseudachorutinae (Neanuridae, Collembola) of unusual habitus, i. e. with short and wide body and head. Following the classical work of Massoud (1967), these species would have to be placed in either *Arlesia* or *Pseudachorutella*, according to the number of their eyes. More detailed morphological studies show, however, that, apart from their peculiar habitus, these forms share a set of unique characters which justify to isolate them in a new genus described below.

The terminology used is that of Deharveng (1983) for antennae and tibiotarsi; labium setae are named after Massoud (1967); dorsal setae are numbered after the row-system (Cassagnau 1974); however, the neanurian nomenclature of Deharveng (1983) is used when precise setal homologies are uncertain (th. II-III).

Abbreviations used in the descriptions: abd., abdominal segment; ant., antennal segment; d/m, ratio dens/mucro; S-setae, setae of type 'S'; th., thoracic segment.

The material is deposited in the collection of the Laboratoire de Zoologie, Université Paul Sabatier, Toulouse, France (LEIT) and in the Museum National d'Histoire Naturelle of Paris, France (MNHN).

***Cephalachorutes* gen. n.**

Type species: *Cephalachorutes asiaticus* sp. n. (by present designation).

**Description of the genus**

Small size: 0.4 to 0.9 mm. Colour blue to white. Body short and wide (about half as wide as long), juvenile-like (fig. 1); 6th abdominal segment reduced.

Antennae (figs. 2-4). Antennae short and stocky; ant. III and ant. IV fused dorsally. Ant. IV with apical papilla reduced, either indistinct or simple (sometimes feebly trilobed), always fused to the apex of the article; organite 'or' globulous, in a ventro-apical position; seven well developed, thickened S-setae on ant. IV (S1 to S4, S7, S8 and MS); S7 much enlarged, overhanging the apex of ant. IV; S4 usually larger than other S-setae but smaller than S7; no s-microchaeta, MS as developed as other S-setae. The ant. III organ has moved to ventral side, with its guard-seta S5 shifted distally towards S8 of ant. IV; S3 close to S2. Ant. I with 7 setae.

Head (figs. 7, 9-12). Postantennal organ absent. 8+8 to 0+0 eyes. Buccal cone short and wide. Lines of setae A-B and C-D on labium arranged more or less perpendicularly. Labrum distally enlarged, like planaria-head. Labral chaetotaxy 4/3,4,2 with the 2 setae of the distal row and the lateral setae of the ante-distal row longer than others. Maxilla very thin, needle-like. Mandible thin, with 2 strong basal teeth and a distal comb of 4 to 12 small teeth (the 2 apical ones sometimes slightly larger).

Tergites (fig. 14). Ordinary setae very short. S-setae very long and thin, shorter on abd. IV. S-setae

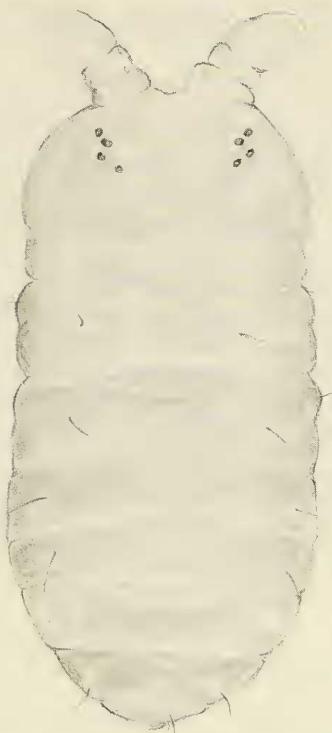


Fig. 1. Habitus of *Cephalachorutes barthae* as an example of the genus. Length: 0.5 mm.

arranged after the standard hypogastrurian pattern (2+ms, 2/1,1,1,1,1 on each half-tergite from th. II to abd. V).

Sternites and body appendages (figs. 18, 19, 21). 1-2 + 1-2 setae on abd. II sternite. Tibiotarsal chaetotaxy: 8+11, 8+11, 7+11, or 7+11, 7+11, 6+11 when the seta M is absent. Ventral tube with

3+3 setae. Furcula well developed, tenaculum with 3+3 teeth, dens usually with 6 setae (only 3 setae in *C. microphthalmus*); mucro about half as long as dens, simple, similar to that of *Pseudachorutes parvulus*.

**Derivatio nominis.** – This genus is called after its unusually large and wide head (from the Greek noun *kephale* = head). Gender of the genus is masculine.

### Discussion

The definition of *Cephalachorutes* relies primarily on the use of antennal chaetotaxy, which appears once again as an efficient taxonomic tool at suprageneric level in Neanuridae (Deharveng 1983).

Among Pseudachorutinae, *Cephalachorutes* gen. n. shares with *Arlesia* Handschin, 1942 and *Pseudachorutella* Stach, 1949 (sensu Massoud 1967) the following characters: postantennal organ absent, maxilla styliform, and mucrodens well developed.

Like the species of *Arlesia* sensu Massoud, the *Cephalachorutes* species have their seta MS of ant. IV of large size, whereas it is reduced to a microchaeta in most Pseudachorutinae and in the primitive family Hypogastruridae. In the type species of the genus *Pseudachorutella* (*P. asigillata*), this seta is also a microchaeta.

*Cephalachorutes* is easily differentiated from *Arlesia* and *Pseudachorutella* by the characters listed in tab.1. These last genera, formerly differentiated by the number of eyes (8+8 in *Pseudachorutella*, less in *Arlesia*, after Massoud 1967), cannot be separated any more on this ground as the species *Arlesia variabilis* Thibaud and Massoud, 1983 has 8+8 to 5+5 eyes. In fact, the complex *Arlesia-Pseudachorutella*, which includes a number of unrelated lines, has to be completely revised.

Table 1. Morphological differences between *Cephalachorutes* and *Arlesia/Pseudachorutella* complex.

	<i>Cephalachorutes</i>	<i>Arlesia/Pseudachorutella</i>
Size	less than 1 mm	usually more than 1 mm
Habitus	short and wide	long and relatively narrow
Ant. IV apical papilla	fused to the apex	not fused, trilobed
Position of ant. IV organite "or"	ventro-apical	dorso-apical
S7 (and often S4) of ant. IV vs other S-setae (figs. 3, 5)	thicker	not thicker
S2-S3 of ant. III organ	ventral	external
Ant. III: S2 length vs S2-S3 distance (figs. 4, 6)	S2 > [S2-S3]	S2 < [S2-S3]*
Labrum shape	like planaria-head	different
Line of labial setae C-D (figs. 7 & 8)	more or less perpendicular to A-B	parallel to A-B
Mandible	2 big basal teeth and a distal comb of 4-12 small teeth	different

\* observed in *Arlesia albipes* and in *Pseudachorutella asigillata*.

Some of the synapomorphies which define *Cephalachorutes* are unique among Pseudachorutinae. They are the habitus, at least in the most evolved species, the fusion of apical papilla to the apex of ant. IV, the position of the ant. IV organite 'or' (which has migrated beyond the apical papilla on the ventral side of the article), the hypertrophy of S7 and S4 on ant. IV and the labrum shape. The arrangement of the distal setae of labium is similar to that of *Kenyura* Salmon, 1954, indicating possible relationships between the two genera. The ventral position of ant. III organ is also observed in other genera, but in a different way. It is likely that other characters will prove to be discriminant, such as the maxilla arms structure (figs. 12, 13), but too few species are known in this respect.

### Characters used in the descriptions of species

In addition to the characters, which are traditionally used for the taxonomy of Pseudachorutinae, the following chaetotaxic characters were found to vary between species:

- seta c3 on head
- number of dorso-external setae on th. II and th. III
- seta a2 on abd. IV
- seta a1 on abd. V: 2+2 (a1 present) or 1+1 setae (a1 absent) between S-setae
- seta M on tibiotarsus

In the literature, the number of S-setae on ant. IV is stated to vary between species, but this is incorrect: there are always 7 S-setae on this article, but usually the thinnest have been overlooked and seta S5 of ant. III has been counted as an ant. IV S-seta.

Some of the chaetotaxic differences illustrated on figs. 15-17 might rather be individual variation than real interspecific differences: arrangement of setae is often variable on head and tergites (particularly on abd. VI), with frequent asymmetries.

Counting the number of eyes is another serious difficulty for species identification in *Cephalachorutes*. Observation is easier if animals are treated by KOH before clearing.

### Check-list of *Cephalachorutes*

- *C. minimus* (Massoud, 1963) comb. n. (from *Arlesia*); Angola.
- *C. delamarei* (Murphy, 1965) comb. n. (from *Arlesia*); Gambia.
- 7. *C. nakaoi* (Yosii, 1966) comb. n. (from *Pseudachorutella*); Nepal.
- *C. microphthalmus* (Barra, 1969) comb. n. (from *Arlesia*); Gabon.
- 6. *C. asiaticus* sp. n. (type species of the genus); Thailand, Indonesia, Philippines.

3. *C. barthae* sp. n.; Thailand.
2. *C. caecus* sp. n.; Thailand.
1. *C. centurionis* sp. n.; Thailand.
5. *C. murphyi* sp. n.; Papua-Niugini.
4. *C. pestilentialiae* sp. n.; Thailand.

*Arlesia pillaii* Prabhoo, 1971 from India might belong to *Cephalachorutes*, but its description is insufficient.

### Distribution, ecology

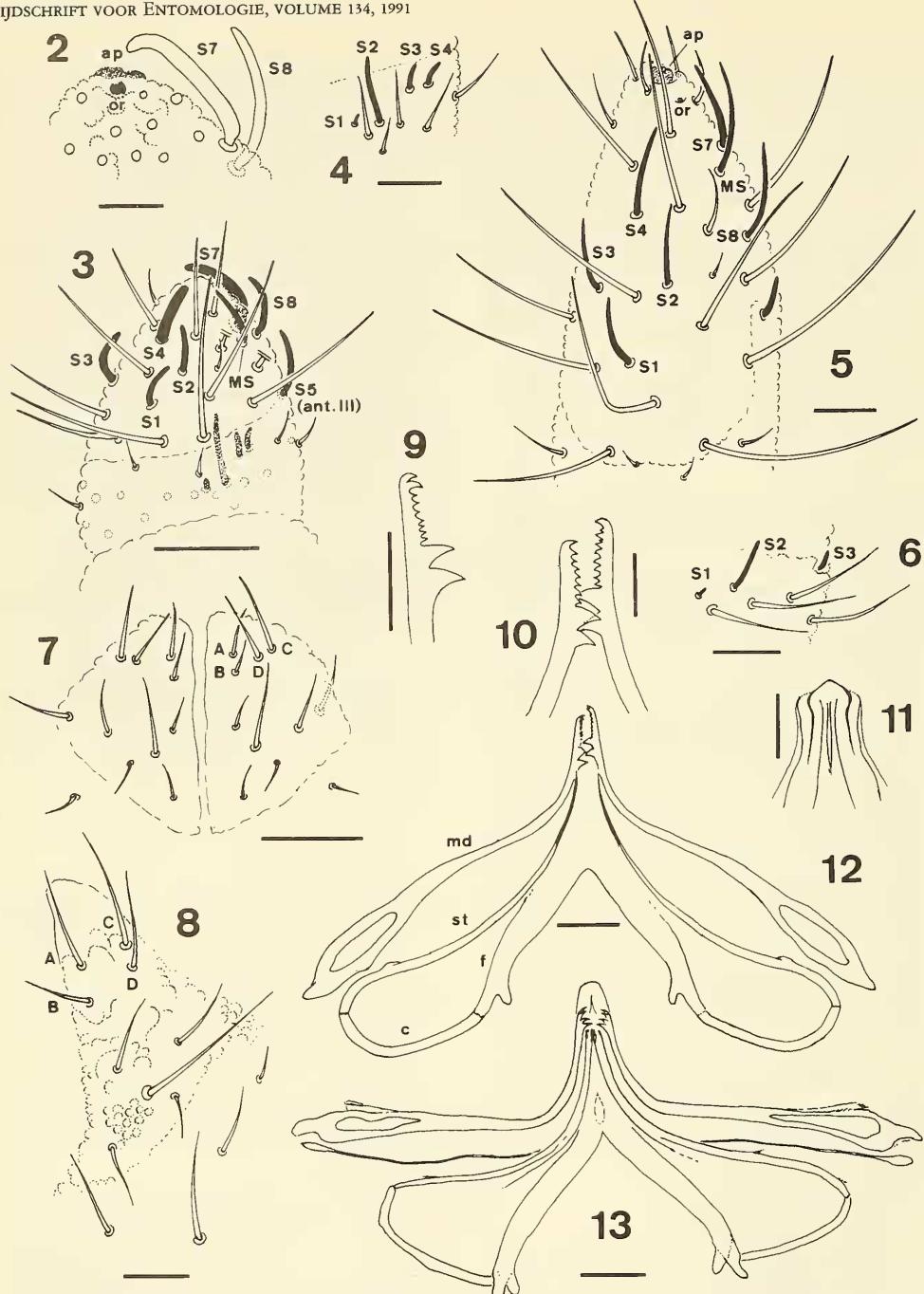
*Cephalachorutes* occurs in Africa, tropical Asia and Papua-Niugini, but not in tropical America. It is a rather frequent inhabitant of forest soils from sea level up to 3,500 m. Species with 4-8+4-8 eyes were collected from litter, whereas those with reduced eyes were mostly found in humus and soil.

### Key to world species of *Cephalachorutes*

Additional characters for the species not redescribed in this paper are given in brackets.

1. Dens with 3 setae ..... *C. microphthalmus*<sup>1</sup> [3-5+3-5 eyes, traces of pigment, claw untoothed, distal comb of mandible with 8-10 small teeth]
- Dens with 6 setae ..... 2
2. 8+8 eyes ..... 6. *C. asiaticus* sp. n.
- Less than 8+8 eyes ..... 3
3. 5+5 eyes ..... 4
- Less than 5+5 eyes ..... 6
4. Distal comb of mandible with 4 small teeth ..... *C. minimus* [pigment present, claw untoothed, description unreliable for chaetotaxy]
- Distal comb of mandible with more teeth ..... 5
5. Seta a2 present on abd. IV ..... 7. *C. nakaoi*
- Seta a2 absent on abd. IV after original drawings ..... *C. delamarei* [pale pigment, claw usually untoothed, sometimes claw I with tooth, distal comb of mandible with 11-12 small teeth]
6. 4+4 eyes ..... 7
- No eyes ..... 9
7. 1+1 setae between S-setae on abd. V ..... 5. *C. murphyi* sp. n.

Note <sup>1</sup>: Here could be placed *Arlesia pillaii* Prabhoo, 1971: 4 setae on dens, 6+6 eyes, pigment present, claw with tooth, distal comb of mandible with 5-6 small teeth, S7 and S4 both thickened; however, the following characters given in the original description are not consistent with the definition of *Cephalachorutes*: 4+4 setae on ventral tube and only one big basal tooth on mandible.



Figs. 2-13. Differential characters on head between *Cephalachorutes* and *Arlesia*. – 2, Apex of ant.IV in *C. barthae* (ventral side, right antenna; ap: apical papilla; or: organite; circles: sockets of setae); 3, Ant.III-IV of *C. centurionis* (dorsal side, right antenna; S-setae and sockets of ordinary setae of ventral side in dots); 4, Ant.III organ in *C. barthae* (ventral side, right antenna); 5, Ant.III-IV of *A. albipes* (dorsal side, right antenna); 6, Ant.III organ in *A. albipes* (ventral side, right antenna); 7, Labium in *C. centurionis*; 8, Labium in *A. albipes*; 9, Mandible of *C. caecus*; 10, Mandibles of *C. barthae*; 11, Labrum in *C. barthae*; 12, Structure of mouthparts in *C. barthae* (c: cardo; f: fulcrum; st: stipa; md: mandible); 13, Structure of mouthparts in *A. albipes*. Scales: 10  $\mu$  (figs. 2, 9-11), 25  $\mu$  (figs. 3-8, 12), 50  $\mu$  (fig. 13).

- 2+2 setae between S-setae on abd. V ..... 8
- 8. 3+S dorso-external setae on th. II and th. III ..... 3. *C. barthae* sp. n.
- 2+S dorso-external setae on th. II and th. III ..... 4. *C. pestilentiae* sp. n.
- 9. Tibiotarsus with seta M ..... 1. *C. centurionis* sp. n.
- Tibiotarsus without seta M ..... 2. *C. caecus* sp. n.

**1. *Cephalachorutes centurionis* sp. n.**  
(figs. 3, 7, 14)

Type material. - Holotype, female, Thailand: Chiang Mai province, Doi Inthanon, 2550 m, soil in primary forest, 1.vi.1989, Deharveng and Bedos leg., sample CM 4 (LEIT). - Paratypes, Thailand: 1 male, 1 female, ibid, sample CM 6; 2 males, 2 females, 2 juv., ibid, humus in primary forest, 9.i.1981, Gouze leg., samples THA 93 and THA 94 (7 in LEIT, 2 in MNHN).

### Description

Length 0.48-0.68 mm. Ratio length/width = 2.3. Colour whitish sometimes with slight traces of grey pigment.

Antennae. Ant. IV with apical papilla entire, fused to the apex; S-setae large and thick; S7 banana-like and larger than others, overhanging the apex of the segment; S4 smaller than S7 but larger than other S-setae. Setae S2 and S5 of ant. III subequal to S8 of ant. IV; on ant. III, S2 is 5 times as long as S3.

Head. No ocelli visible, but sometimes 1+1 minute black ocular spots. Seta c3 absent. Mouthparts typical of the genus; distal comb of mandible with 9-10 small teeth.

Tergites. On th. II and th. III, 3+S dorso-external setae. On abd. IV, a2 absent. On abd. V, 2+2 ordinary setae between S-setae.

Body appendages. Seta M present on tibiotarsus. Claw without tooth. Dens with 6 setae. Mucro less than half as long as dens ( $d/m = 2.1-2.3$ ).

Derivatio nominis. - This species is named after our friend Alain Gouze, firemen officer, who collected the first specimens of this species (from the Latin noun in genitive case *centurio* = commandant).

Discussion. - Cf *C. caecus*.

**2. *Cephalachorutes caecus* sp. n.**  
(fig. 9)

Type material. - Holotype, male juvenile, Thailand: Chiang Mai province, Doi Chiang Dao, 950 m, humus in forest, 4.vii.1985, Deharveng leg., sample DC 67 (LEIT). - Paratypes, Thailand: 1 juv., ibid, 1000 m, soil in forest,

4.vii.1985, Deharveng leg., sample DC 56; 1 female juv., 3 juv., ibid, 500 m, wet litter in forest, 17.xii.1980, Deharveng leg., sample THA 4 (other specimens in alcohol); 1 female, Chiang Mai province, Doi Mae Tho, 1300 m, humus in forest, 14.vii.1985, Deharveng and Bedos leg., sample CL 11 (4 in LEIT, 2 in MNHN).

### Description

Length 0.55-0.65 mm. Ratio length/width = 2.2. Pigment absent.

Antennae. Ant. IV with apical papilla slightly knobbed, fused to the apex; S7 large, fairly thicker than S4; other S-setae thinner and rather long. Setae S2 and S5 of ant. III are subequal to S8 of ant. IV; on ant. III, S2 is 4.5 times as long as S3.

Head. No eyes, no ocular spots of pigment. Seta c3 absent. Mouthparts typical of the genus; distal comb of mandible with 8-9 small teeth, the 2 apical ones relatively stronger.

Tergites. On th. II and th. III, 3+S dorso-external setae. On abd. IV, a2 absent. On abd. V, 2+2 ordinary setae between S-setae.

Body appendages. Seta M absent on tibiotarsus. Claw without tooth. Dens with 6 setae. Mucro more than half as long as dens ( $d/m = 1.8-1.9$ ).

Derivatio nominis. - This species is named for the absence of eyes (from the Latin adjective *caecus* = blind).

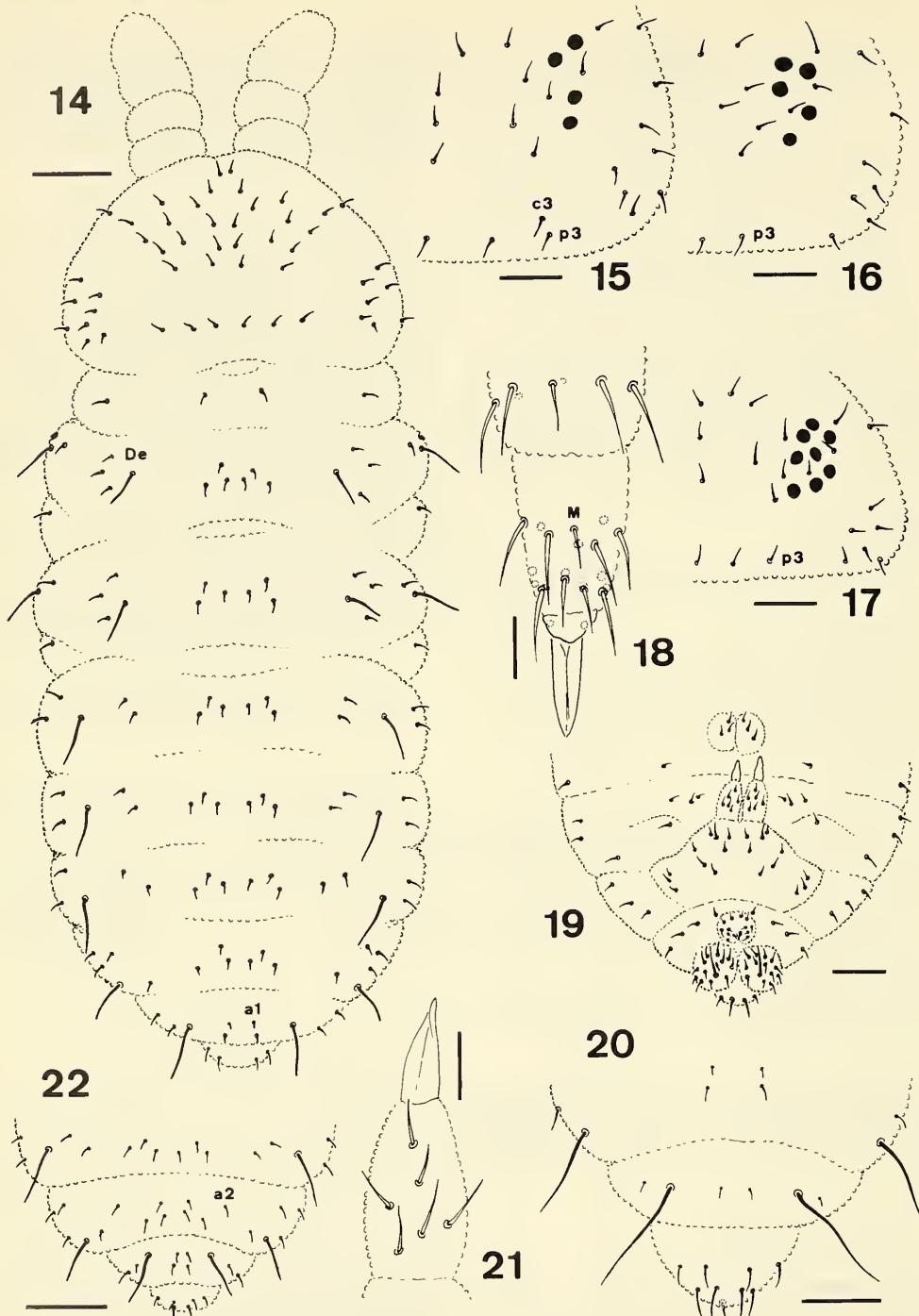
Discussion. - *C. centurionis* and *C. caecus* are the only species of the genus devoid of eyes. They have also the most developed S-setae on ant. IV and ant. III. They differ by the size of 2 apical teeth of the distal comb of the mandible (stronger in *C. caecus*), the tibiotarsal seta M (present in *C. centurionis*, absent in *C. caecus*) and the ratio dens/mucro (higher in *C. centurionis*).

**3. *Cephalachorutes barthae* sp. n.**  
(figs. 1, 2, 4, 10, 11, 12, 19)

Type material. - Holotype, male, Thailand: Chiang Mai province, Doi Mae Tho, 1300 m, in litter forest, 14.vii.1985, Deharveng and Bedos leg., sample CL 17 (LEIT). - Paratypes, Thailand: 1 female, same sample; 1 male, 2 juv., ibid, sample CL 18; 1 female, Chiang Mai province, Doi Inthanon, 2500 m, humus in primary forest, 2.i.1981, Deharveng leg., sample THA 72; 1 juv., ibid, 2000 m, humus in primary forest, 2.i.1981, Deharveng leg., sample THA 77; 2 juv., ibid, 1700 m, litter in primary forest, 1.vi.1989, Deharveng and Bedos leg., sample CM 34 (5 in LEIT, 2 in MNHN).

### Description

Length 0.55-0.70 mm. Ratio length/width = 2. Colour blue.



Figs. 14-22. Differential characters between species of *Cephalachorutes*. - 14, Dorsal chaetotaxy of *C. centurionis*; 15, Ocular area of *C. pestilentiae*; 16, Ocular area of *C. nakaoi*; 17, Ocular area of *C. asiaticus*; 18, Chaetotaxy of leg II in *C. asiaticus* (ventral side; dotted circles: sockets of dorsal setae); 19, Ventral chaetotaxy of *C. barthae*; 20, Abd.IV-VI of *C. murphyi*; 21, Mucrodens of *C. asiaticus*; 22, Abd.III-VI of *C. asiaticus*. Scales: 10  $\mu$  (figs. 18, 21), 25  $\mu$  (figs. 15-17), 50  $\mu$  (figs. 14, 19, 20, 22).

Table 2. Differential characters between *C. barthae*, *C. pestilentiae* and *C. murphyi*.

	<i>barthae</i>	<i>pestilentiae</i>	<i>murphyi</i>
Body length/width	2	2	2.3
Seta c3 on head	absent	present	absent
Dorsal-external setae on th. II-III	3+S	2+S	2+S
Seta a2 on abd. IV	absent	present	absent
Seta a1 on abd. V	present	present	absent

Antennae. Ant. IV with apical papilla entire but knobbed, fused to the apex; S-setae rather thin, S4 and particularly S7 thicker. Seta S5 of ant. III shorter than S8 of ant. IV; on ant. III, S2 subequal to S5 and 3 times as long as S3.

Head. 4+4 eyes, sometimes not obvious. Seta c3 absent. Mouthparts typical of the genus; distal comb of mandible with 8-10 small teeth.

Tergites. On th. II and th. III, 3+S dorso-external setae. On abd. IV, a2 absent. On abd. V, 2+2 ordinary setae between S-setae.

Body appendages. Seta M absent on tibiotarsus. Claw with a minute inner tooth, sometimes indistinct. Dens with 6 setae. Mucro more than half as long as dens ( $d/m = 1.7-1.9$ ).

Derivatio nominis. – This species is named to thank Florence Barth for her drawing of the *Cephalachorutes* habitus (fig. 1).

Discussion. – Cf *C. murphyi*.

#### 4. *Cephalachorutes pestilentiae* sp. n.

(fig. 15)

Type material. – Holotype, female, Thailand: Chiang Mai province, north of Ban Muang Ngai, 600 m, litter of moss forest, 4.vi.1989, Deharveng and Bedos leg., sample CM 59 (LEIT). – Paratypes, Thailand: 7 females, 2 juv., same sample (numerous specimens in alcohol) (7 in LEIT, 2 in MNHN).

#### Description

Length 0.70-0.85 mm. Ratio length/width = 2. Colour blue.

Antennae. Ant. IV with apical papilla knobbed, fused to the apex; S4 and particularly S7 thicker than other S-setae. Setae S2 and S5 of ant. III subequal to S8 of ant. IV; on ant. III, S2 is more than 3 times as long as S3.

Head. 4+4 eyes (2+2 ocular spots well distinct in alcohol). Seta c3 present; more setae on lateral area than in other species. Mouthparts typical of the genus; distal comb of mandible with 8-9 small teeth.

Tergites. On th. II and th. III, only 2+S dorso-external setae. On abd. IV, a2 present. On abd. V,

2+2 ordinary setae between S-setae.

Body appendages. Seta M absent on tibiotarsus. Claw with a minute inner tooth. Dens with 6 setae. Mucro more than half as long as dens ( $d/m = 1.7-1.8$ ).

Derivatio nominis. – The name of the species refers to its type locality, a doline with a very high level of carbon dioxide up to 5% (from the Latin noun in genitive case *pestilentia* = bad air).

Discussion. – Cf. *C. murphyi*.

#### 5. *Cephalachorutes murphyi* sp. n. (fig. 20)

Type material. – Holotype, female, Papua-Nugini: Wau, Bulldog road, 2600 m, in litter of moss forest, 1.xii.1979, Deharveng leg., sample PNG 266 (LEIT). – Paratypes, Papua-Nugini: 1 male, 1 female, Wau, Bulldog road, 2650 m, Rhododendron litter, 1.xii.1979, Deharveng leg., sample PNG 263 (LEIT).

#### Description

Length 0.75-0.90 mm. Ratio length/width = 2.3. Colour blue. Habitus less thick-set than the other species of the genus. Abd. VI not hidden under abd. V.

Antennae. Ant. IV with apical papilla knobbed, fused to the apex; S4 and particularly S7 thicker than other S-setae, which are long and thin. Seta S5 of ant. III half as long as S8 of ant. IV; on ant. III, S2 slightly longer than S5 and less than 3 times as long as S3.

Head. 4+4 eyes not well distinct. Seta c3 absent. Mouthparts typical of the genus; distal comb of mandible with 9-10 small teeth.

Tergites. Dorsal chaetotaxy very reduced, difficult to observe on our material. On th. II and th. III, only 2+S dorso-external setae. On abd. IV, a2 absent and only 1+1 setae in the p-row between S-setae. On abd. V, 1+1 ordinary setae between S-setae.

Body appendages. Seta M absent on tibiotarsus. Claw with one obvious inner tooth. Dens with 6 setae. Mucro half as long or slightly longer than dens ( $d/m = 1.8-2$ ).

Derivatio nominis. – This species is named in honour of Prof. Murphy who noticed in 1965 that species from Africa should be separated from the neotropical group of *Arlesia*.

**Discussion.** – Three species of *Cephalachorutes* have 4+4 eyes: *C. barthae*, *C. pestilentialae* and *C. murphyi*. They are also devoid of seta M on tibiotarsus. They can be differentiated after table 2. In addition, *C. microphthalmus* has 3 to 5 eyes on each side, but the species is distinguished easily from the latter by its dens with 3 setae instead of 6.

#### 6. *Cephalachorutes asiaticus* sp. n.

(figs. 17, 18, 21, 22)

Type material. – Holotype, male, Thailand: Chiang Mai province, Ban On Luoi, 500 m, bamboo litter, 20.vii.1985, Deharveng leg., sample CL 44 (LEIT). – Paratypes, Thailand: 2 males, 1 female, 5 juv., same sample (other specimens in alcohol) (6 in LEIT, 2 in MNHN).

Other material. – The following material has been considered as *C. asiaticus*: Indonesia: 1 male, Sulawesi Selatan, Maros district, Kappang, Gua Salukkan Kallang (cave), 200 m, flood debris, 14.vii.1986, sample INDO 142; 2 juv., Sulawesi Selatan, Maros district, Kappang, 300 m, in litter of Lantana bushes, 8.vii.1989, Deharveng and Bedos leg., sample SULS 35 (LEIT). – Philippines: 2 males, 3 females, 2 juv., Mindoro Island, Puerto Galera, 150 m, litter in forest, 29.xii.1979, Deharveng leg., sample PHI 116 (LEIT).

#### Description

Length 0.55-0.65 mm. Ratio length/width = 2.3. Colour blue.

**Antennae.** Ant. IV with apical papilla fused to the apex; S7 thicker than other S-setae; S2 slightly larger than S3; other S-setae fairly smaller. Seta S5 of ant. III shorter than S8 of ant. IV; on ant. III, S2 subequal to S5 and less than 3 times as long as S3.

Head. 8+8 eyes. Seta c3 absent. Mouthparts typical of the genus; distal comb of mandible with 9-10 small teeth.

Tergites. On th. II and th. III, 3+S dorso-external setae. On abd. IV, a2 present. On abd. V, 2+2 ordinary setae between S-setae.

Body appendages. Seta M present on tibiotarsus. Claw with a minute inner tooth. Dens with 6 setae. Macro half as long as dens ( $d/m = 2$ ).

Derivatio nominis. – This species is named for its large repartition through the tropics in South east Asia.

**Discussion.** – *C. asiaticus* is the only species of *Cephalachorutes* with 8+8 eyes. As other primitive character, this species has, with *C. nakaoi*, the most complete chaetotaxy of tergites in the genus. An-

tennal S-setae are relatively poorly developed. Specimens from Indonesia and Philippines have been referred to *C. asiaticus*, but slight differences in relative width of the body and relative length of macro were observed with the Thai material.

#### 7. *Cephalachorutes nakaoi* (Yosii, 1966) comb. n. (fig. 16)

Material (type material not examined). – Nepal: 1 male, 1 female, 6 juv., Marsyandi valley, between Chame and Tarapani, 2450 m, in litter and humus of *Quercus glauca* and *Rhododendron*, 4.x.77, Deharveng leg., sample Nep 77B-118 (LEIT).

#### Description

Length 0.60-0.70 mm. Ratio length/width = 2.2. Colour blue.

**Antennae.** Apical papilla of ant. IV with 3 lobes more or less distinct, fused to the apex; S4 and particularly S7 thicker than other S-setae, which are relatively slender. Seta S5 of ant. III shorter than S8 of ant. IV; on ant. III, S2 slightly longer than S5 and 3 times as long as S3.

Head. 5+5 ocelli, sometimes not well distinct. Seta c3 absent. Mouthparts typical of the genus; distal comb of mandible with 7-12 small teeth.

**Tergites.** On th. II and th. III, 3+S dorso-external setae. On abd. IV, a2 present. On abd. V, 2+2 ordinary setae between S-setae.

**Body appendages.** Seta M present on tibiotarsus. Claw with one inner tooth, minute or sometimes indistinct. Dens with 6 setae. Macro half as long as dens or slightly smaller ( $d/m = 2-2.2$ ).

**Discussion.** – The original description of the species by Yosii (1966) differs in the apical papilla of ant. IV being conspicuous and distinctly trilobed, whereas it is variable but fused to apex in our material. Other characters are concordant, but chaetotaxic information is lacking for the type specimens which had lost the S-setae on body and antennae, according to the author. *C. nakaoi* has 5+5 eyes like the African species (*C. minimus*, *C. delamarei* and *C. microphthalmus*). Available differential characters are few, because the chaetotaxy of these last species is poorly known. The main differences are given in the key.

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## REFERENCES

Cassagnau, P., 1974. Chétotaxie et phylogénie chez les Collemboles Poduromorphes. – *Pedobiologia* 14: 300-312.

Deharveng, L., 1983. Morphologie évolutive des Collemboles Neanurinae en particulier de la lignée néanuriennne. – *Travaux du Laboratoire d'Ecobiologie des Arthropodes Edaphiques, Toulouse* 4 (2): 1-63.

Massoud, Z., 1967. Monographie des Neanuridae, Collemboles Poduromorphes à pièces buccales modifiées. – In: *Biologie de l'Amérique Australe, CNRS* 3: 7-399.

Yosii, R., 1966. Collembola of Himalaya. – *Journal of the College of Arts and Sciences, Chiba University* 4 (4): 461-531.

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